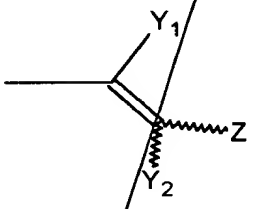
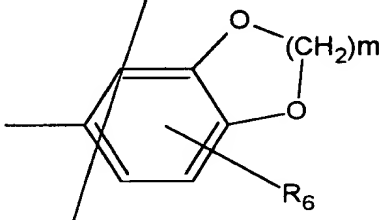
is an integer of 0 to 4, $-R_5$, wherein R_5 represents substituted or unsubstituted aryl, or a substituted or unsubstituted heterocyclic group, or the following group:



wherein Y_1 and Y_2 independently represent hydrogen, halogen or lower alkyl, and Z represents substituted or unsubstituted aryl or the following group:

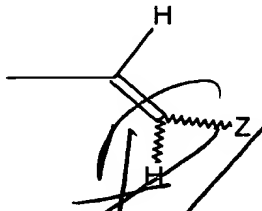


wherein m is an integer of 1 to 3 and R_6 represents hydrogen, hydroxy, lower alkyl, lower alkoxy, halogen, nitro or amino, or a substituted or unsubstituted heterocyclic group; and wherein the substituted aryl and the substituted heterocyclic group have 1 to 3 independently-selected substituents selected from the group consisting of lower alkyl, hydroxy, lower alkoxy or lower alkoxy substituted with a substituent (s) selected f rom the group consisting of hydroxy, lower alkoxy, halogen, amino, azido, carboxy and lower alkoxycarbonyl, halogen, nitro, amino, lower alkylamino, di(lower alkyl)amino, trifluoromethyl, tri-fluoromethoxy, benzyloxy, phenyl, phenoxy, lower alkanoyl, lower alkanoyloxy, aroyloxy, aralkanoyloxy, carboxy, lower alkoxycarbonyl, lower

alkylcarbamoyl, di(lower alkyl)- carbamoyl, sulfo, lower alkoxysulfonyl, lower alkylsulfamoyl and di(lower alkyl)sulfamoyl; or a pharmaceutically acceptable salt thereof, as an active ingredient.

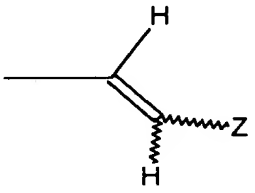
7. The method of Claim 6 wherein X_1 and X_2 are O.

8. The method of claim 6, wherein R_4 is the following group:



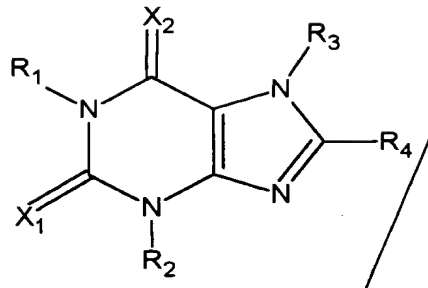
wherein Z has the same meaning as defined above.

9. The method of claim 6, wherein X_1 and X_2 are O, and R_4 is the following group:

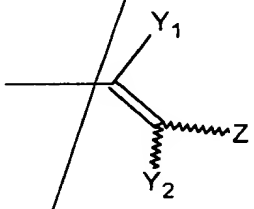


wherein Z has the same meaning as defined above.

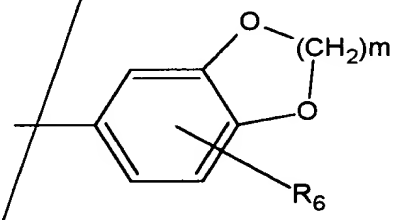
10. A method of treating neurodegenerative disorders except for Parkinson's disease and attention deficit hyperactivity disorder, which method comprises administering an effective dose of a xanthine derivative represented by formula (1):



wherein X_1 and X_2 independently represent O or S, R_1, R_2 and R_3 independently represent hydrogen, lower alkyl, lower alkenyl or lower alkynyl; R_4 represents cycloalkyl, $-(CH_2)_n$ wherein n is an integer of 0 to 4, $-R_5$, wherein R_5 represents substituted or unsubstituted aryl, or a substituted or unsubstituted heterocyclic group, or the following group:



wherein Y_1 and Y_2 independently represent hydrogen, halogen or lower alkyl, and Z represents substituted or unsubstituted aryl or the following group:

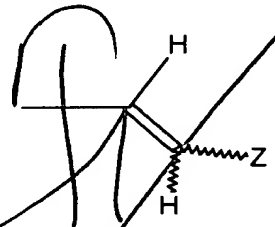


wherein m is an integer of 1 to 3 and R_6 represents hydrogen, hydroxy, lower alkyl, lower alkoxy, halogen, nitro or amino, or a substituted or unsubstituted heterocyclic group; and wherein the substituted aryl and the substituted heterocyclic group have 1 to 3 independently-selected substituents selected

from the group consisting of lower alkyl, hydroxy, lower alkoxy or lower alkoxy substituted with a substituent (s) selected f rom the group consisting of hydroxy, lower alkoxy, halogen, amino, azido, carboxy and lower alkoxycarbonyl, halogen, nitro, amino, lower alkylamino, di(lower alkyl)amino, trifluoromethyl, tri-fluoromethoxy, benzyloxy, phenyl, phenoxy, lower alkanoyl, lower alkanoyloxy, aroyloxy, aralkanoyloxy, carboxy, lower alkoxycarbonyl, lower alkylcarbamoyl, di(lower alkyl)- carbamoyl, sulfo, lower alkoxysulfonyl, lower alkylsulfamoyl and di(lower alkyl)sulfamoyl; or a pharmaceutically acceptable salt thereof, as an active ingredient.

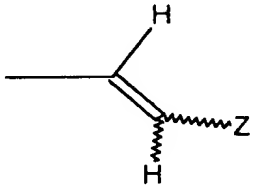
11. The method of Claim 10 wherein X_1 and X_2 are O.

12. The method of claim 10, wherein R_4 is the following group:



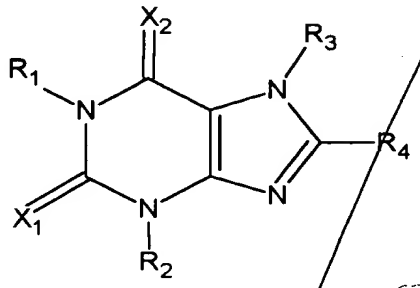
wherein Z has the same meaning as defined above.

13. The method of claim 10, wherein X_1 and X_2 are O, and R_4 is the following group:

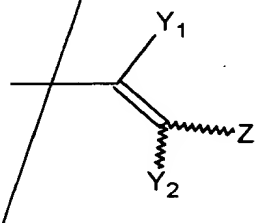


wherein Z has the same meaning as defined above.

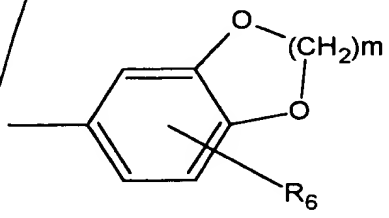
14. A method of treating Alzheimer's disease, which comprises administering an effective dose of the xanthine derivative represented by formula (1):



wherein X_1 and X_2 independently represent O or S, R_1, R_2 and R_3 independently represent hydrogen, lower alkyl, lower alkenyl or lower alkynyl; R_4 represents cycloalkyl, $-(CH_2)_n$, wherein n is an integer of 0 to 4, $-R_5$, wherein R_5 represents substituted or unsubstituted aryl, or a substituted or unsubstituted heterocyclic group, or the following group:



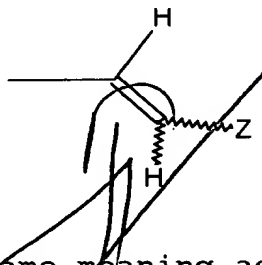
wherein Y_1 and Y_2 independently represent hydrogen, halogen or lower alkyl, and Z represents substituted or unsubstituted aryl or the following group:



wherein m is an integer of 1 to 3 and R_6 represents hydrogen, hydroxy, lower alkyl, lower alkoxy, halogen, nitro or amino, or a substituted or unsubstituted heterocyclic group; and wherein the substituted aryl and the substituted heterocyclic group have 1 to 3 independently-selected substituents selected from the group consisting of lower alkyl, hydroxy, lower alkoxy or lower alkoxy substituted with a substituent (s) selected f rom the group consisting of hydroxy, lower alkoxy, halogen, amino, azido, carboxy and lower alkoxycarbonyl, halogen, nitro, amino, lower alkylamino, di(lower alkyl)amino, trifluoromethyl, tri-fluoromethoxy, benzyloxy, phenyl, phenoxy, lower alkanoyl, lower alkanoyloxy, aroyloxy, aralkanoyloxy, carboxy, lower alkoxycarbonyl, lower alkylcarbamoyl, di(lower alkyl)- carbamoyl, sulfo, lower alkoxysulfonyl, lower alkylsulfamoyl and di(lower alkyl)sulfamoyl; or a pharmaceutically acceptable salt thereof, as an active ingredient.

15. The method of Claim 14 wherein X_1 and X_2 are O.

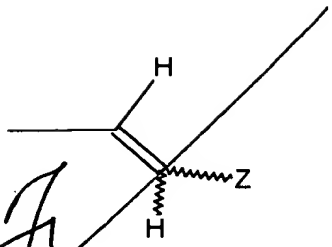
16. The method of claim 14, wherein R_4 is the following group:



wherein Z has the same meaning as defined above.

17. The method of claim 14, wherein X_1 and X_2 are O, and R_4 is

the following group:



wherein Z has the same meaning as defined above.--